CLAIMS

1. A ceramic armor, comprising:

(a) a ceramic material encapsulated within a metallic material, on one side of said ceramic material, a composite stiffening plate being interposed between said ceramic material and said metallic material; and

(b) said metallic material being plastically deformed about other sides of said ceramic material.

2. The ceramic armor of Claim 1, wherein said metallic material has a coefficient of thermal expansion (CTE) greater than a CTE of said ceramic material, and said stiffening plate has an elastic modulus greater than that of the metallic material.

3. The ceramic armor of Claim 1, wherein said metallic material comprises a Titanium alloy, and said stiffening plate comprises a cermet composite.

4. The ceramic armor of Claim 1, wherein said metallic material comprises a Titanium alloy, and said stiffening plate comprises a Ti-TiB composite.

5. The ceramic armor of Claim 1, wherein said metallic material comprises a Titanium alloy, and said stiffening plate comprises an armor ceramic.

6. The ceramic armor of Claim 1, wherein said metallic material comprises a Titanium alloy, and said stiffening plate comprises an armor ceramic chosen from the group consisting of WC, B_4C, Al_2O_3 and TiB_2.

7. The ceramic armor of Claim 6, wherein said Titanium alloy comprises Ti-6Al-4V or Ti-6Al-4V ELI.

8. The ceramic armor of Claim 7, wherein said ceramic material comprises a dense SiC ceramic material such as PAD SiC-N.

9. The ceramic armor of Claim 8, wherein elastic modulus of the Titanium alloy is about 115 GPa, elastic modulus of the ceramic material is about 450 GPa, and elastic modulus of the stiffening plate is greater than 130 GPa.

10. The ceramic armor of Claim 1, wherein said metallic material comprises a three piece assembly consisting of a backing plate, a frame having an open center, and a cover plate, said assembly defining an internal chamber designed to closely receive

said ceramic material and stiffening plate being interposed between said ceramic material and said backing plate.

11. The ceramic armor of Claim 10, wherein said frame includes a plurality of cavities therein, each of said cavities being closely filled with ceramic material and a stiffening plate.

12. The ceramic armor of Claim 11, wherein said plurality of cavities comprises four cavities, each filled with a ceramic tile or plate and a stiffening plate.

13. The ceramic armor of Claim 12, wherein said frame includes a plurality of separate side pieces assembled together to form a periphery, and a pair of cross members connected between opposed side pieces to define said cavities.

14. The ceramic armor of Claim 12, further including a plurality of assemblies stacked vertically.

15. A method of making ceramic armor, comprising:

(a) providing a backing plate, a frame having an open center, and a cover plate, together defining an internal chamber;

(b) inserting a metal composite stiffening plate followed by a piece of ceramic material into said chamber, said ceramic

material and stiffening plate being closely received within said chamber with said stiffening plate interposed between said ceramic material and said backing plate, said backing plate, frame, cover plate, stiffening plate, and ceramic material together defining an assembly;

(c) said metallic material having a coefficient of thermal expansion greater than a coefficient of thermal expansion of said ceramic material;

(d) placing said assembly with said ceramic material therein into a hot press consisting of a furnace located within a sealed chamber;

(e) conducting a hot pressing procedure on said assembly under controlled parameters of temperature, pressure and atmosphere until said metallic material is plastically deformed around said ceramic material.

16. The method of Claim 15, wherein said metallic material comprises a Titanium alloy, and said stiffening plate comprises a Ti-TiB composite.

17. The method of Claim 16, wherein said Titanium alloy comprises Ti-6Al-4V or Ti-6Al-4V ELI, and a ratio by volume between Ti and TiB in said composite is from 4:1 to 1:1.

18. The method of Claim 17, wherein said ceramic material comprises a dense SiC ceramic material such as PAD SiC-N.

19. The method of Claim 18, wherein the coefficient of thermal expansion (CTE) of the Titanium alloy is about 10.5 x 10^{-6} in/in °C from 0-600 °C, the CTE of the ceramic material is about 4.1 x 10^{-6} in/in °C from 0-600 °C, and the CTE of the stiffening plate is about 8.5-10.5 x 10^{-6} in/in °C from 0-600 °C.

20. The method of Claim 15, wherein said hot pressing procedure includes the following steps:

(a) evacuating said sealed chamber to a pressure of about 10 torr;

(b) heating said sealed chamber to about 800°C and, during said heating step, purging said sealed chamber with an inert gas at least once followed by evacuating said sealed chamber back to 1 to 1.5 torr;

(c) maintaining pressure in said sealed chamber to less than 1.5 torr once temperature therein has risen to 800°C;

(d) increasing said temperature from 900°C - 1300°C.

21. The method of Claim 20, wherein once said temperature reaches 900°C, increasing physical pressure on said assembly in

said chamber to at least 250 psi and holding temperature and physical pressure constant for at least two hours.

22. The method of Claim 15, wherein said internal chamber of said assembly includes four sub-chambers.

23. The method of Claim 22, wherein said sub-chambers are created by machining said frame using an EDM process.

24. The method of Claim 15, wherein said coefficient of thermal expansion of said ceramic material is no greater than 9 x 10^{-6} in/in°C.

25. The method of Claim 24, wherein said ceramic material is chosen from the group consisting of Silicon Carbide, Boron Carbide, Tungsten Carbide, Titanium Diboride, Aluminum Oxide, Silicon Nitride, and Aluminum Nitride.

26. The method of Claim 15, wherein said atmosphere comprises a high purity Argon atmosphere.